

processor, or other programmable apparatus provide operations for implementing the functions specified in the flowchart block(s) or operation(s).

[0051] Accordingly, execution of instructions associated with the blocks or operations of the flowchart by a processor, or storage of instructions associated with the blocks or operations of the flowchart in a computer-readable storage medium, support combinations of operations for performing the specified functions. It will also be understood that one or more blocks or operations of the flowchart, and combinations of blocks or operations in the flowchart, may be implemented by special purpose hardware-based computer systems and/or processors which perform the specified functions, or combinations of special purpose hardware and program code instructions.

[0052] Expressed as a method for avoiding the activation of the NAS Attach retry 10 sec timer, the method would take the form illustrated in FIG. 7. Initially, UE receives a signal 610 from the eNB to release the RRC connection after the TAU request is rejected. In the UE, RRC notifies NAS that RRC release has begun 620. NAS enters a “hold” status 630, avoiding the execution of an Attach attempt and retry timer activation. RRC connection release runs 640 for a period of about sixty (60) milliseconds. When the RRC connection release is complete, RRC informs NAS that the release is concluded 650. NAS is then free to trigger an Attach Request 660. That request causes the UE to begin Random Access Signaling 670 to re-establish a network connection. The end user has network service in about seventy milliseconds rather than eleven seconds.

[0053] The following list of abbreviations is included for reference to clarify any abbreviations that appear in the Detailed Description, the Figures, and that may appear in the claims.

[0054] NAS=Non Access Stratum

[0055] RRC=Radio Resource Control

[0056] TAU=Tracking Area Update

[0057] NW=Network

[0058] PDP context=Packet Data Protocol context

[0059] MME=Mobility Management Entity

[0060] eNB=evolved NodeB

[0061] ISR=Idle Mode Signalling

[0062] UE=User Equipment

[0063] CS=Circuit Switched

[0064] PS=Packet Switched

[0065] LTE=Long Term Evolution

[0066] E-UTRAN=Evolved Universal Terrestrial Radio Access Network

[0067] SRB=Signaling Radio Bearer

[0068] PDCP=Packet Data Convergence Protocol

[0069] RLC=Radio Link Control

[0070] ACK=Acknowledgement

[0071] SGSN=Service GPRS Support Node

[0072] GPRS=General Packet Radio Service

[0073] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended

claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

1-32. (canceled)

33. A method comprising:

receiving a message to indicate radio resource control connection to be released;

awaiting a notification from a lower layer indicating the radio resource control connection release is completed;

executing a predetermined delay timer; and

upon one of the predetermined delay timer expiring or receiving the notification from lower layer indicating radio resource control connection release is completed, allowing an Attach procedure to start.

34. The method of claim 33, wherein a lower layer comprises a radio resource control layer.

35. The method of claim 33, wherein the notification is sent from the radio resource control layer to a non-access stratum layer.

36. The method of claim 33, wherein the message is received after Tracking Area Update procedure Reject.

37. The method of claim 33, further comprising:

receiving a notification from radio resource control layer to non-access stratum layer to indicate that radio resource control connection release is in progress.

38. The method of claim 33, wherein the Attach procedure is executed using the existing connection or a new connection is established using Random Access procedure.

39. The method of claim 38, wherein a cause value of Tracking Area Update procedure Reject requires initiation of an Attach procedure.

40. The method of claim 33, wherein a cause value of the received message is “other.”

41. The method of claim 33, wherein the delay timer value is set by at least one of signaling from network, specification, and user equipment.

42. An apparatus comprising:

at least one processor; and

at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least:

receive a message to indicate radio resource control connection to be released;

await a notification from a lower layer indicating the radio resource control connection release is completed;

execute a predetermined delay timer;

upon one of the predetermined delay timer expiring or receiving the notification from lower layer indicating radio resource control connection release is completed, allow an Attach procedure to start.

43. The apparatus of claim 42, wherein a lower layer comprises a radio resource control layer.

44. The apparatus of claim 42, wherein the notification is sent from the radio resource control layer to a non-access stratum layer.

45. The apparatus of claim 42, wherein the message is received after Tracking Area Update procedure Reject.

46. The apparatus of claim 42, further configured to receive a notification from radio resource control layer to non-access stratum layer to indicate that radio resource control connection release is in progress.